(N = 2000) and a test set (N = 4486). A proportion of glucose and HbA1c specimens were mismatched by randomly switching either HbA1c or glucose results. The outcome of interest was correct classification of vials as either 'matched' or 'mismatched'. The outcome was predicted using a Bayesian network that encoded probabilistic relationships among analytes, self-reported diabetes status and a latent 'mismatch' variable. Performance was compared against an established approach LabRespond via area under the receiver-operating characteristics curves (AUCs). An AUC = 1.0 and 0.5 represents perfect prediction and random guessing respectively. **RESULTS:** The network was predictive of glucose and HbA1c mismatches that produced 20 mg/dL glucose and 1 point HbA1c discrepancies between true and mismatched scores (AUC = 0.84 (+/–0.03)). The network also identified errors among those self-reporting diabetes (N = 329) AUC = 0.81 (+/–0.02) and predicted self-report of diabetes diagnosis AUC = 0.95 (+/–0.01). The network also performed better ($z = 12.04$, $p < 0.001$) than LabRespond (AUC = 0.76 +/– 0.01). **CONCLUSION:** A Bayesian network that models probabilistic relationships among analyte values can accurately identify mismatched specimens. The algorithm is best at identifying mismatches that result in a clinically significant magnitude of error. Information about diabetes diagnosis acted to reduce uncertainty in a mismatch. Decision analysis may be have direct application in reducing cost at point-of-care.

PDB80

REDUCING COSTS AND IMPROVING OUTCOMES BY REDUCING MEDICAL ERRORS: A COMPARISON OF EXPERTS WITH PROBABLISTIC LABORATORY ERROR DETECTION IN A POPULATION OF PRE-DIABETICS

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OBJECTIVE: Human evaluation of laboratory errors is a costly standard of practice. Automating error detection may reduce costs and improve patient outcomes. To compare an automated probabilistic approach (Bayesian network) to human expert error detection in a pre-diabetic population. **METHODS:** Two test sets (A and B) each N = 60 were generated from the results of the Diabetes Prevention Program (DPP). Glucose values were randomly drawn from a pre-diabetic distribution and expected HbA1c score was estimated by the DPP based formula: $HbA1c = 4.22 + 0.1604 \times Glucose$. In each test set, 37% of the HbA1c scores were mismatched to generate vial labeling errors. Eleven experts recruited from the American Academy of Clinical Chemists and a Bayesian network evaluated the results to detect mismatched vials. Six and five experts were assigned to test sets A and B respectively. Receiver-Operating Characteristics (ROC) curves were generated for each expert and for the Bayesian network and area under the curves (AUCs) were compared via null hypothesis testing. An AUC = 1 and 0.5 represents perfect prediction and random guessing respectively. **RESULTS:** The Bayesian network was predictive of glucose and HbA1c mismatches in both Test Set A (AUC = 0.86 (+/–0.05)) and Test Set B (AUC = 0.93 (+/–0.04)). Expert performance was on average worse in Test Sets A (AUC = 0.74 (+/–0.07)) and B (AUC = 0.76 (+/–0.07)). Individual analysis revealed that the network performed significantly better ($z < 1.96$, $p < 0.05$) than 7 of the 11 experts; in no case did the network perform worse than the experts. **CONCLUSION:** A Bayesian network that models probabilistic relationships among analyte values is often better than laboratory experts at identifying laboratory errors. This suggests that an automated program may help reduce costs and improve patient outcomes in the laboratory.

HEALTH CARE INTERVENTIONS—Cost Studies

PHC1

A COST COMPARISON OF CARDIAC SURGERIES BY CHOICE OF FIBRIN SEALANT

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OBJECTIVE: Fibrin sealants are efficacious in reducing perioperative bleeding during a variety of surgical procedures, which may result in decreased hospital costs and lengths of stay (LOS). This study sought to compare hospital costs and LOS by three fibrin sealants used in cardiac surgical procedures. **METHODS:** Data were extracted from a large U.S. hospital-based, service-level comparative database. Procedures were identified using principal ICD-9 codes. Patients who received either FloSeal® only or one of two comparison products (Gelfoam® + thrombin or Surgicel® + thrombin) and were discharged from hospital between April 1, 2003 and September 30, 2006 were included. Costs were considered from the hospital perspective and were derived from either reported actual costs or an estimated calculation of costs-to-charges from the Medicare Cost Report. Regression modeling with log transformation was employed to compare differences in fixed hospital costs (those insensitive to volume), variable costs (those sensitive to volume), and post-operative LOS. Control variables included age, gender, All Patient Refined-Diagnosis Related Group severity codes, region, hospital teaching status, bed size, population served (urban or rural), and primary payer. **RESULTS:** A total of 35,672 discharges were included. The regression models showed that patients who received Gelfoam + thrombin had higher fixed and variable costs (+21% and +40%, $p < 0.01$, respectively) and Surgicel + thrombin had higher fixed and variable costs (+18% and +14.5%, $p < 0.01$, respectively) compared to FloSeal. In terms of fixed costs, this amounted to an additional $21,803 for Gelfoam + thrombin and an additional $19,208 for Surgicel + thrombin cohorts. In variable costs, this amounted to an additional $26,609 for Gelfoam + thrombin and $22,181 for Surgicel + thrombin cohorts. All three cohorts had similar post-operative LOS. **CONCLUSION:** FloSeal demonstrated cost reduction in hospital stays for cardiac procedures, compared to two other fibrin sealants. Given small margins achieved by hospitals today, cost-effective surgical aids with better or similar outcomes should be considered in surgical service lines.

PHC2

A COMPARISON OF COSTS ASSOCIATED WITH SPINAL SURGERIES BY CHOICE OF FIBRIN SEALANT

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OBJECTIVE: Fibrin sealants are used in a variety of surgical procedures to reduce wound bleeding. This may consequently decrease hospital costs and lengths of stay (LOS). This study sought to compare costs and LOS following fibrin sealant use during spinal surgery. **METHODS:** Data were extracted from a large U.S. hospital-based, service-level comparative database. Procedures were identified using principal ICD-9 codes. Patients who received either FloSeal® only or one of two comparison products (Gelfoam® + thrombin or Surgicel® + thrombin) and were discharged from hospital between April 1, 2003 and September 30, 2006 were included. Costs were considered from the hospital perspective and were derived from either reported actual costs or